I U C L I D

D a t a s e t

Existing Chemical	Substance ID: 111-40-0
CAS No.	111-40-0
EINECS Name	2,2'-iminodi(ethylamine)
EINECS No.	203-865-4
Molecular Formula	C4H13N3

Dataset created by: EUROPEAN COMMISSION - European Chemicals Bureau

This dossier is a compilation based on data reported by the European Chemicals Industry following 'Council Regulation (EEC) No. 793/93 on the Evaluation and Control of the Risks of Existing Substances'. All (non-confidential) information from the single datasets, submitted in the IUCLID/HEDSET format by individual companies, was integrated to create this document.

The data have not undergone any evaluation by the European Commission.

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1.0.1 OECD and Company Information

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1.0.2 Location of Production Site

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1.0.3 Identity of Recipients

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1.1 General Substance Information

Substance type: organic
Physical status: liquid

1.1.1 Spectra

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1.2 Synonyms

1,2,-Ethanediamine, N-(2-aminoethyl)-
Source: Texaco Ltd/Huntsman Corporation Ltd London

1,2-Ethanediamine, N-(2-aminoethyl)-
Source: DELAMINE BV Delfzijl
Dow Benelux N. V. Terneuzen

1,2-ETHANEDIAMINE, N-(2-AMINOETHYL)-
Source: Bayer AG Leverkusen

1,2-Ethanediamine, N-(2-aminoethyl)- (9CI)
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

1,4,7-TRIAZAHEPTAN
Source: Bayer AG Leverkusen

1,4,7-Triazaheptane
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

1,5-DIAMINO-3-AZAPENTAN
Source: Bayer AG Leverkusen

1,5-Diamino-3-azapentane
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

2,2'-DIAMINODIETHYLAMIN
Source: Bayer AG Leverkusen

2,2'-Diaminodiethylamin
Source: TRANSOL Chemiehandel GmbH Essen

2,2'-Diaminodiethylamine
Source: DELAMINE BV Delfzijl
Dow Benelux N. V. Terneuzen
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4
Texaco Ltd/Huntsman Corporation Ltd London

2,2'-IMINO-BIS-ETHANAMIN
Source: Bayer AG Leverkusen

2,2'-Iminobis(ethanamine)
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

2,2'-Iminobis(ethylamin)
Source: TRANSOL Chemiehandel GmbH Essen

2,2'-Iminodiethylamine
Source: Dow Benelux N. V. Terneuzen
Texaco Ltd/Huntsman Corporation Ltd London

2,2'diaminodiethylamine
Source: Union Carbide Benelux Antwerpen

3-aza-1,5-pentanediamine
Source: Dow Benelux N. V. Terneuzen

3-Aza-1,5-pentanediamine
Source: Texaco Ltd/Huntsman Corporation Ltd London

3-azapentaan-1,5 ethaandiamine
Source: TRANSOL CHEMICALS BV RIDDERKERK

3-AZAPENTAN-1,5-DIAMIN
Source: Bayer AG Leverkusen

3-Azapentane-1,5-diamine
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

Bis(.beta.-aminoethyl)amine
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

BIS(2-AMINOETHYL)AMIN
Source: Bayer AG Leverkusen

Bis(2-aminoethyl)amine
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4
Texaco Ltd/Huntsman Corporation Ltd London

BIS(BETA-AMINOETHYL)AMIN
Source: Bayer AG Leverkusen

bis-(2-aminoethyl)amine
Source: Union Carbide Benelux Antwerpen

ChS-P 1
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

DETA
Source: DELAMINE BV Delfzijl
Union Carbide Benelux Antwerpen
Texaco Ltd/Huntsman Corporation Ltd London
Bayer AG Leverkusen

DETA
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA Samples used in this document:
DETA sample A : purity 98.9%
DETA sample B : purity 98.5%
DETA comm. (commercial grade) : 90.8% DETA
: 8.9% AEP
(Aminoethylpiperazine)
: 0.34 % EDA
(Ethylenediamine)
DETA-HP (high purity) : 98.8% DETA
: 1% AEP
: 0.21% EDA
DETA-HC (Hearts-cut) : 99.97% DETA
: trace AEP and EDA

di-(2-aminoethyl)-amine
Source: TRANSOL CHEMICALS BV RIDDERKERK

Diethylene Triamine
Source: ISIS/Riskline, release VI, 1997, Haskoning
Petrasol B.V. Gorinchem

Diethylenetriamine
Source: DELAMINE BV Delfzijl
Dow Benelux N. V. Terneuzen
Sybron Chemie Nederland B.V. EDE
Texaco Ltd/Huntsman Corporation Ltd London

diethylenetriamine
Source: Union Carbide Benelux Antwerpen

DIETHYLENETRIAMINE
Source: ANCHOR CHEMICAL(UK)LTD MANCHESTER

Diethylenetriamine (8CI)
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

Diethylentriamin
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4
TRANSOL Chemiehandel GmbH Essen

DIETHYLENTRIAMIN
Source: Bayer AG Leverkusen

N,N-BIS(2-AMINOETHYL)AMIN
Source: Bayer AG Leverkusen

N,N-bis(2-aminoethyl)amine
Source: DELAMINE BV Delfzijl

N,N-Bis(2-aminoethyl)amine
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

n-(2-aminoethyl)-1,2 ethaandiamine
Source: TRANSOL CHEMICALS BV RIDDERKERK

N-(2-AMINOETHYL)-1,2-ETHANDIAMIN
Source: Bayer AG Leverkusen

N-(2-Aminoethyl)-1,2-ethanediamine
Source: DELAMINE BV Delfzijl
BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

N-(2-Aminoethyl)ethylenediamine
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

Triamin
Source: Bayer AG Leverkusen

[BIS(2-AMINOETHYL)-AMIN]
Source: Chemimpo B.V. ''s Hertogenbosch

Remark: 3-Azapentan-1,5-diamine
1,2 Ethanediamine, N-(Z-aminoethyl)
Source: Berol Nobel AB Stenungsund

1.3 Impurities

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1.4 Additives

-

1.5 Quantity

Quantity 10 000 - 50 000 tonnes

1.6.1 Labelling

Labelling: as in Directive 67/548/EEC
Symbols: C
other RM: H
Specific limits: yes
R-Phrases: (21/22) Harmful in contact with skin and if swallowed
(34) Causes burns
(43) May cause sensitization by skin contact
S-Phrases: (1/2) Keep locked up and out of reach of children
(26) In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
(36/37/39) Wear suitable protective clothing, gloves and eye/face protection
(45) In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

1.6.2 Classification

Classification: as in Directive 67/548/EEC
Class of danger: corrosive
R-Phrases: (21/22) Harmful in contact with skin and if swallowed

Classification: as in Directive 67/548/EEC
Class of danger: corrosive
R-Phrases: (34) Causes burns

Classification: as in Directive 67/548/EEC
Class of danger:
R-Phrases: (43) May cause sensitization by skin contact

1.7 Use Pattern

Type: type
Category: Non dispersive use

Type: type
Category: Use in closed system

Type: type
Category: Use resulting in inclusion into or onto matrix

Type: industrial
Category: Basic industry: basic chemicals

Type: industrial
Category: Chemical industry: used in synthesis

Type: industrial
Category: Fuel industry

Type: industrial
Category: Paints, lacquers and varnishes industry

Type: industrial
Category: Paper, pulp and board industry

Type: industrial
Category: Polymers industry

Type: industrial
Category: Textile processing industry

Type: industrial
Category: other

Type: use
Category: Adhesive, binding agents

Type: use
Category: Complexing agents

Type: use
Category: Corrosive inhibitors

Type: use
Category: Flotation agents

Type: use
Category: Fuel additives

Type: use
Category: Intermediates

Type: use
Category: Lubricants and additives

Type: use
Category: Process regulators

Type: use
Category: Softeners

Type: use
Category: Solvents

Type: use
Category: Surface-active agents

Type: use
Category: other: Epoxydharzhärter

Type: use
Category: other: Hardeners

Type: use
Category: other: Paper-wet-strenght resins

Type: use
Category: other: Rohstoff für Synthese von Piperazinen und Polyaminen

1.7.1 Technology Production/Use

-

1.8 Occupational Exposure Limit Values

Type of limit: MAC (NL)
Limit value: 4 mg/m3
Remark: Skin notation
Source: DELAMINE BV Delfzijl

(1)

Type of limit: MAK (DE)
Limit value:
Remark: Kein MAK-Wert festgelegt.
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

(2)

Type of limit: OES (UK)
Limit value: 4 mg/m3
Schedule: 8 hour(s)
Source: Texaco Ltd/Huntsman Corporation Ltd London

(3)

Type of limit: TLV (US)
Limit value: 4.2 mg/m3
Remark: Skin notation
Source: DELAMINE BV Delfzijl

(4)

Type of limit: TLV (US)
Limit value: 4 mg/m3
Remark: Requires skin notation
Source: Dow Benelux N. V. Terneuzen

Type of limit: TLV (US)
Limit value: 4.2 mg/m3
Remark: Wert bezieht sich auf Haut.
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

(5)

Type of limit: TLV (US)
Limit value:
Remark: Limit value: 1 ppm
Wert bezieht sich auf Haut.
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

(5)

Type of limit: TLV (US)
Limit value: 4.2 mg/m3
Remark: Wert bezieht sich auf Haut.
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

(5)

Type of limit: TLV (US)
Limit value: 4.2 mg/m3
Remark: skin
Source: Union Carbide Benelux Antwerpen

Type of limit: TLV (US)
Limit value: 4 mg/m3
Schedule: 8 hour(s)
Source: Texaco Ltd/Huntsman Corporation Ltd London

(6)

Type of limit: TLV (US)
Limit value: 4.2 mg/m3
Remark: Wert bezieht sich auf Haut.
Source: BASF AG Ludwigshafen

(5)

Type of limit: other
Limit value: 4 mg/m3
Remark: French VME
Source: Texaco Ltd/Huntsman Corporation Ltd London

Type of limit: other
Limit value: 4.5 mg/m3
Short term expos.
Limit value: 10 mg/m3
Remark: Swedish Exposure limit values
Source: Texaco Ltd/Huntsman Corporation Ltd London

(7)

Type of limit:
Limit value:
Remark: TLV (USA) 1988/89: TWA 1 ppm (4mg/m3)
Source: Bayer AG Leverkusen

1.9 Source of Exposure

Remark: Two routes of manufacturing: catalytic reduction of ethylene with NH3 or reaction of ethylene dichloride with NH3, neutralisation with NaOH and salt removal. Separation of DETA by fractionated distillation. Manufacturing process completely closed; no emissions of DETA.
Source: DELAMINE BV Delfzijl

Remark: Consumer exposure to DETA is not likely.
Dow production site is located in Terneuzen, The Netherlands.
Route of manufacturing:
Reaction of ethylene dichloride with NH3, neutralisation with NaOH and salt removal. Separation of DETA by fractionated distillation. Manufacturing process completely

closed; no high emissions of DETA to the atmosphere (0.05% of production, estimated). During production and processing estimated max. emissions to waste water are 0.5% of production (worst case approach).

Source: Dow Benelux N. V. Terneuzen

Remark: As the quantities of this substance placed on the EU market by Union Carbide Benelux N.V. are normally sourced from the manufacturing facilities of its U.S. parent company, no exposure can arise within the EU from the manufacture of these quantities. The comments below on exposure are restricted to the uses for which Union Carbide believes its customers use this substance in the EU.

Major uses: chemical intermediate and additive to fuels.

Sources of human exposure: Negligible human exposure, assuming appropriate industrial hygiene and personal protective precautions are observed.

Sources of environmental exposure: Negligible, as the substance is chemically transformed into other substances and residues released to waste water treatment units where the substance readily biodegrades. As fuel additive, the substance is incinerated.

Source: Union Carbide Benelux Antwerpen

Remark: Product no longer marketed in Europe by Texaco/Huntsman. Product was imported into bulk storage at Rotterdam and then distributed in bulk to customers. Bulk Storage and Haulage manufacturers used good industry practice procedures in handling/storing/distribution of product. See further comments in section 1.10

Source: Texaco Ltd/Huntsman Corporation Ltd London

1.10.1 Recommendations/Precautionary Measures

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1.10.2 Emergency Measures

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1.11 Packaging

-

1.12 Possib. of Rendering Subst. Harmless

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1.13 Statements Concerning Waste

-

1.14.1 Water Pollution

Classified by: KBwS (DE)
Labelled by: KBwS (DE)
Class of danger: 2 (water polluting)
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

Classified by: other: Bayer AG
Labelled by: other: Bayer AG
Class of danger: 2 (water polluting)
Source: Bayer AG Leverkusen

1.14.2 Major Accident Hazards

Legislation: Stoerfallverordnung (DE)
Substance listed: no
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

(8)

Legislation:
Substance listed: no
Source: Bayer AG Leverkusen

1.14.3 Air Pollution

Classified by: TA–Luft (DE)
Labelled by: TA–Luft (DE)
Number: 3.1.7 (organic substances)
Class of danger: III
Source: BASF AG Ludwigshafen
BASF Antwerpen N. V. Antwerpen 4

Classified by: other: Bayer AG
Labelled by: other: Bayer AG
Number: 3.1.7 (organic substances)
Class of danger: III
Source: Bayer AG Leverkusen

1.15 Additional Remarks

Remark: Incineration of DETA at federal improved incinerators.
Source: Dow Benelux N. V. Terneuzen

Remark: disposal: incinerate in a furnace where peritted under national and local regulations.
At very low concentration in water (about 10 ppm), diethylenetriamine is biodegradable in a biological wastewater treatment system.

transport: diethylenetriamine is classified as a corrosive

product for ADR/RID/IMDG/ADNNR/ICAO regulations.
Diethylenetriamine is shipped in road/rail tankcars, tankcontainers, ISOtanks and smaller packages (e;g.drums).

Source: Union Carbide Benelux Antwerpen

Remark: At maximum tonnage level reported a max avge of approx 1 truck/week of DETA would have left bulk storage for transport to customers. Procedures for Ship transfer and road tanker wago transfer designed to minimise risk and loss.
The following transport classifications apply to DETA:

UN No: 2079
ADR/RID: 8,53 (b)
Kemler No: 80
CEFIC TREMCARD No 80G16
ICAO/IATA Class 8
IMO Class 8
NOT classed as a Marine Pollutant
UK HAZCHEM 2 X

Source: Texaco Ltd/Huntsman Corporation Ltd London

(9)

1.16 Last Literature Search

-

1.17 Reviews

-

1.18 Listings e.g. Chemical Inventories

-

2.1 Melting Point

Value: = –39 degree C
Decomposition: no
Sublimation: no
Method: other: ASTM D1015/55
GLP: no data
Source: Dow Benelux N. V. Terneuzen

(10)

2.2 Boiling Point

Value: = 205 degree C
Method: other
GLP: no data
Source: Dow Benelux N. V. Terneuzen

(11)

Value: = 207 degree C at 1010 hPa
Decomposition: no
Method: other: DIN 53 171
GLP: no data
Source: Dow Benelux N. V. Terneuzen

(12)

2.3 Density

Type: relative density
Value: = .95 g/cm3 at 20 degree C
Method: other: DIN 51 757
Year: 1984
GLP: no data
Source: Dow Benelux N. V. Terneuzen

(13)

2.3.1 Granulometry

–

2.4 Vapour Pressure

Value: = .2 hPa at 20 degree C
Method: other (calculated)
Year: 1984
GLP: no
Source: Dow Benelux N. V. Terneuzen

(14)

Value: = .37 hPa at 20 degree C
Method: other (calculated)
GLP: no data
Source: Dow Benelux N. V. Terneuzen

(15)

Value: = 1 hPa at 20 degree C
Method: other (calculated)
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(16)

Value: = 2.1 hPa at 50 degree C
Method: other (calculated)
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(17)

2.5 Partition Coefficient

log Pow: ca. -1.3
Method: other (calculated)
Year: 1987
GLP: no
Remark: Calculation method used:
Leo, A: CLOGP-3.54, MedChem Software 1987, Daylight,
Chemical Information System, Claremont, CA 91711, USA
Source: Dow Benelux N. V. Terneuzen
(18)

2.6.1 Water Solubility

Value: at 20 degree C
Qualitative: miscible
pKa: 10.1 at 25 degree C
pH: = 12.5 at 25 other: % wt. and 20 degree C
Method: other
Year: 1991
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(19)

2.6.2 Surface Tension

-

2.7 Flash Point

Value: = 97 degree C
Type: closed cup
Method: other: DIN 51 578
Year: 1984
GLP: no
Source: Dow Benelux N. V. Terneuzen
(20)

Value: = 98 degree C
Type: closed cup
Method: other
Year:
GLP: no
Source: Dow Benelux N. V. Terneuzen
(21)

Value: = 104 degree C
Type: open cup
Method: other: Cleveland open cup
Year:
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(22)

2.8 Auto Flammability

Value: = 325 degree C hPa
Method: other: DIN 51794
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(23)

Value: = 358 degree C at 1010 hPa
Method: other
Year: 1991
GLP: no
Source: Dow Benelux N. V. Terneuzen
(21)

Value: = 395 degree C
Method: other
Year: 1988
GLP: no data
Source: Dow Benelux N. V. Terneuzen
(17)

2.9 Flammability

Result: flammable
Method: other
GLP: no
Remark: Flammability limits: LFL 2.0%, UFL 6.7% (150 degr.)
Source: Dow Benelux N. V. Terneuzen
(21)

2.10 Explosive Properties

Result: not explosive
Method: other
GLP: no
Source: Dow Benelux N. V. Terneuzen
(21)

Result:
Source: Dow Benelux N. V. Terneuzen
(24)

2.11 Oxidizing Properties

Result: no oxidizing properties
Method: other
GLP: no
Source: Dow Benelux N. V. Terneuzen
(21)

2.12 Additional Remarks

Remark: Dangerous reaction: exothermal reaction with acids.
Source: Dow Benelux N. V. Terneuzen
(24)

3.1.1 Photodegradation

Type:
Method:
Year: **GLP:**
Test substance:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

3.1.2 Stability in Water

Type: biotic
t1/2 pH 8 **:** ca. 2 – 4 day at 20 degree C
Method: other: see reference
Year: 1991 **GLP:** yes
Test substance: other TS: [14C]-DETA, purity 97%
Remark: The stability of DETA was determined in 3 samples of primarysewage of the City of Midland (MI, USA). T1/2 given is for 1 mg DETA/l. Other concentrations tested were 5 (t1/2 is ca.8 days) and 15 mg/l (t1/2 is ca. 14 days).
Source: Dow Benelux N. V. Terneuzen

(25)

Type: biotic
t1/2 pH 8 **:** > 14 day at 20 degree C
Degradation: = 61.2 % after 14 day
Method: other: see reference
Year: 1991 **GLP:** yes
Test substance: other TS: [14C]-DETA, purity 97%
Remark: – The stability of DETA was determined in 3 samples of Higgins Lake Water (Michigan, USA). T1/2 given is for 1 mg DETA/l. Other concentrations tested were 5 and 15 mg/l.
– There was no evidence of formation of N-nitrosamines.
Source: Dow Benelux N. V. Terneuzen

(25)

Type: biotic
t1/2 pH 8 **:** > 14 day at 20 degree C
Degradation: = 61.2 % after 14 day
Method: other: see reference
Year: 1991 **GLP:** yes
Test substance: other TS: [14C]-DETA, purity 97%
Remark: – The stability of DETA was determined in 3 samples of Houghton Lake Water (Michigan, USA). T1/2 given is for 1 mg DETA/l. Other concentrations tested were 5 and 15 mg/l.
– There was no evidence of formation of N-nitrosamines.
Source: Dow Benelux N. V. Terneuzen

(25)

3.1.3 Stability in Soil

Type: laboratory **Radiolabel:** yes
Concentration: 10 mg/kg
Soil temp.: 25 degree C
Soil humidity: 18.75 g water/100g soil dry weight
Soil classif.: USDA **Year:** 1991
Content of clay: 12 – 14 %
silt: 20 – 24 %
sand: 64 – 66 %
Organ. carbon: 3.6 – 4.3 %
Cation exch. capac. ca. 9.4 meq/100 g soil dry weight
Microbial biomass: other: no data
Dissipation time
DT50: = 4 day
DT90: = 28 day
Method: other: EPA protocol (see reference)
Year: 1990 **GLP:** yes
Test substance: other TS: [14C]–DETA, purity 97%
Remark: The soil used was designated "Londo Soil" (sandy loam). Two DETA concentrations were used, 10 and 25 mg/kg.
Source: Dow Benelux N. V. Terneuzen

(25)

Type: laboratory **Radiolabel:** yes
Concentration: mg/kg
Soil temp.: 25 degree C
Soil humidity: 25.62 g water/100g soil dry weight
Soil classif.: USDA **Year:** 1991
Content of clay: = 36 %
silt: = 28 – 30 %
sand: = 34 – 36 %
Organ. carbon: = 5.9 %
Cation exch. capac. ca. 13.5 meq/100 g soil dry weight
Microbial biomass: other: no data
Dissipation time
DT50: < 4 day
DT90: = 28 day
Method: other: EPA protocol (see reference)
Year: 1990 **GLP:** yes
Test substance: other TS: [14C]–DETA, purity 97%
Remark: The soil used was designated "Perrinton Soil" (clay loam). Two DETA concentrations were used, 10 and 25 mg/kg.
Source: Dow Benelux N. V. Terneuzen

(26)

3.2 Monitoring Data (Environment)

Type of measurement:
Medium:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

3.3.1 Transport between Environmental Compartments

Type: adsorption
Media: water – soil
Method: other
Year:
Result: Batch equilibrium adsorption studies were conducted with ethylenediamine (EDA) and diethylenetriamine (DETA) to examine the physical–chemical factors which influence the partitioning of the amines to soil. Adsorption isotherms were generated using a variety of surface and subsurface soils and the results from this investigation demonstrated that, despite their miscibility in water, both EDA and DETA adsorb strongly to soil. The rate of adsorption for both amines was fairly rapid and equilibrium was achieved within several hours. Adsorption isotherms could be best described by the Freundlich equation and a series of Freundlich adsorption constants, Kd, were developed for each soil and amine. Adsorption of the ethyleneamines correlated closely with both the cation exchange capacity (CEC) and organic content of the soil. Soils with increased CEC and organic content exhibited higher affinities for the amines. This dependence of adsorption on CEC and organic content was mostlikely due to the strong electrostatic interaction between the positively charged amine and the negatively charged soilsurface.

For all soils DETA adsorbed more strongly than EDA, althoughthe adsorption constants varied over an order of magnitude for both compounds. In order to decrease the variation observed in the Kd–values, the adsorption constants were normalized to the organic carbon content of the soil and unique Koc–values were developed for each amine. The averageKoc–value for EDA and DETA was 4.766 and 19.111, respectively.
Source: Dow Benelux N. V. Terneuzen

(27)

3.3.2 Distribution

Media: water – air
Method: Calculation according Mackay, Level I
Year: 1992
Remark: Results of Mackay Level I calculation indicate that 0.077% and 99.9% of the substance will partition into air and water, respectively. The alkaline properties of DETA are notevaluated in the model and a log of Kow of –1.315 has been used. So although the model cannot be applied, it can be concluded that the substance mainly partition into water.
Source: Dow Benelux N. V. Terneuzen

(28)

3.4 Mode of Degradation in Actual Use

Remark: no data available
Source: Dow Benelux N. V. Terneuzen

3.5 Biodegradation

Type: aerobic
Inoculum: activated sludge, domestic
Concentration: related to COD (Chemical Oxygen Demand)
Degradation: after 28 day
Result: under test conditions no biodegradation observed
Method: Directive 84/449/EEC, C.6 "Biotic degradation – closed bottle test"
Year: 1984 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test substance: Purity >99%

(29)

Type: aerobic
Inoculum: predominantly domestic sewage, adapted
Concentration: 80 mg/l related to COD (Chemical Oxygen Demand)
Degradation: = 0 % after 20 day
Result: under test conditions no biodegradation observed
Method: Directive 84/449/EEC, C.6 "Biotic degradation – closed bottle test"
Year: 1984 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Comparable results were obtained using concentrations 2, 4, 8, and 24 mg COD/l.
Source: Dow Benelux N. V. Terneuzen

(30)

Type: aerobic
Inoculum: activated sludge, domestic
Concentration: 20 mg/l related to DOC (Dissolved Organic Carbon)
Degradation: = 80 – 90 % after 30 day
Result: inherently biodegradable
Method: Directive 87/302/EEC, part C, p. 123 "Biodegradation: Modified SCAS test"
Year: 1988 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: Lag phase was ca. 23 days.
Source: Dow Benelux N. V. Terneuzen
Test substance: Purity >99%

(29)

Type: aerobic
Inoculum: activated sludge
Concentration: related to DOC (Dissolved Organic Carbon)
Degradation: > 70 % after 28 day
Result: inherently biodegradable
Method: OECD Guide–line 302 B "Inherent biodegradability: Modified Zahn–Wellens Test"
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(31)

Type: aerobic
Inoculum: predominantly industrial sewage
Concentration: related to COD (Chemical Oxygen Demand)
Degradation: = 0 % after 20
Result: under test conditions no biodegradation observed
Method: other
Year: 1978 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(32)

Type: aerobic
Inoculum: activated sludge
Concentration: 100 mg/l related to Test substance
Degradation: = 0 % after 14 day
Result: under test conditions no biodegradation observed
Method: other: according to OECD Guide–line 301 C; modified MITI Test I
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Sludge sampling were made at 10 different places in Japan. The sludge samples were mixed. Test substance was added to 30 mg/l sludge.

(33)

Type: aerobic
Inoculum: aerobic microorganisms
Concentration: related to COD (Chemical Oxygen Demand)
Degradation: ca. 55 % after 10 day
Result: other: under test condition biodegradation observed
Method: other: not specified
Year: 1976 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: BOD < 10 mg/g; COD = 1315 mg/g
Source: Dow Benelux N. V. Terneuzen
Test condition: Tests were performed after neutralization of the aqueous solution.

(34)

3.6 BOD5, COD or BOD5/COD Ratio

Remark: no data available
Source: Dow Benelux N. V. Terneuzen

3.7 Bioaccumulation

Species: Cyprinus carpio (Fish, fresh water)
Exposure period: 42 day at 25 degree C
Concentration: 2 mg/l
BCF: < .3 – 1.7
Elimination: no data
Method: other: according to OECD Guide–line 301 C; modified MITI Test I
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: At a concentration of 0.2 mg/l of DETA the 6–week BCF was <2.8 – 6.3
Source: Dow Benelux N. V. Terneuzen
Test condition: Test was done under flow through condition. Dissolved oxygenin the test tank was 6–8 mg O2/l.

(33)

3.8 Additional Remarks

Remark: no additional remarks
Source: Dow Benelux N. V. Terneuzen

AQUATIC ORGANISMS

4.1 Acute/Prolonged Toxicity to Fish

Type: semistatic
Species: Leuciscus idus (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
LC0: =
LC50: = 430
LC100: =
--- : =
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: LC50 values for 24-, 48-, and 72-hour exposure time were 2020 mg/l, 1320 mg/l, and 660 mg/l.
Source: Dow Benelux N. V. Terneuzen

(29)

Type: semistatic
Species: Oryzias latipes (Fish, fresh water)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** yes
LC50: = 780
Method: other: according to Japanese Industrial Standard JIS K 0102-1986-71
Year: **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: LC50 was estimated by Doudoroff method or Probit method.
Source: Dow Benelux N. V. Terneuzen
Test condition: Water temperature = 25°C
Dissolved O2 = 6-8 mg/l
Renewal of water at every 8-16 hours

(33)

Type: semistatic
Species: Poecilia reticulata (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50: = 1014
Method: other: EEC Directive 79/831, Annex V, part C
Year: **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen
Test substance: Diethylene triamine purity >99%

(35)

Type: static
Species: Oryzias latipes (Fish, fresh water)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** yes
NOEC: =
LC0: =
LC50: = 1000
LC100: =
--- : =
Method: other: see reference
Year: 1982 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Weight of Oryzias latipes = 0.2 g.
Source: Dow Benelux N. V. Terneuzen

(36)

Type: static
Species: Poecilia reticulata (Fish, fresh water)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
LC0: = 200
LC50: =
LC100: =
--- : =
Method: Directive 84/449/EEC, C.1 "Acute toxicity for fish"
Year: 1974 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen

(37)

Type: static
Species: Poecilia reticulata (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
LC0: =
LC50: = 332
LC100: =
--- : =
Method: Directive 84/449/EEC, C.1 "Acute toxicity for fish"
Year: 1978 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen

(38)

Type: static
Species: Poecilia reticulata (Fish, fresh water)
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: = 100
LC0: =
LC50: = 248
LC100: =
--- : =
Method: other: DIN 38412 Teil 15
Year: 1977 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Fresh water species.
Source: Dow Benelux N. V. Terneuzen

(39)

Type: static
Species: Poecilia reticulata (Fish, fresh water)
Exposure period:
Unit: **Analytical monitoring:** no data
LD0 : = 92 – 103
Method: other: force–fed
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: Dose is given in mg/kg (forced feed)
Source: Dow Benelux N. V. Terneuzen

(40)

4.2 Acute Toxicity to Aquatic Invertebrates

Species: Artemia salina (Crustacea)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
EC0: =
EC50: = 710
EC100: =
--- : =
Method: other: see reference
Year: 1974 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(41)

Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
EC0: =
EC50: = 17
EC100: =
--- : =
Method: Directive 84/449/EEC, C.2 "Acute toxicity for Daphnia"
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(42)

Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no
NOEC: =
EC0: =
EC50: = 64.6
EC100: =
--- : =
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Only 5 animals used per test concentration.
Source: Dow Benelux N. V. Terneuzen
Test substance: Purity was >99%

(29)

Species: Daphnia magna (Crustacea)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** no
NOEC: =
EC0: = 20
EC50: = 37
EC100: > 100
--- : =
Method: other: DIN 38412 Teil 11
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(43)

Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
EC0: = 2
EC50: = 16
EC100: = 100
--- : =
Method: other: DIN 38412 Teil 11
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(43)

Species: Daphnia magna (Crustacea)
Exposure period: 48 hour(s)
Unit: mg/l **Analytical monitoring:** no data
LC50 : = 53.5
Method: other: EEC Directive 79/831, Annex V, part C
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: T = 20°C; Dutch standard water; pH 8; Hardness 1.4 meq/l; photoperiod 8:16 h light:dark; static test condition
Test substance: Diethylene triamine purity >99%

(35)

4.3 Toxicity to Aquatic Plants e.g. Algae

Species: Scenedesmus subspicatus (Algae)
Endpoint: growth rate
Exposure period: 96
Unit: mg/l **Analytical monitoring:** no data
NOEC: =
LOEC: =
EC0: =
EC10: = 206
EC50: = 592
Method: other: DIN 38412 L 9; Scenedesmus cell multiplication test
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(44)

Species: Selenastrum capricornutum (Algae)
Endpoint: other: growth rate and biomass
Exposure period: 72 hour(s)
Unit: mg/l **Analytical monitoring:** no
NOEC: = 10.2
LOEC: =
EC0: =
EC10: =
EC50: = 1164
EbC50 : = 187
Method: Directive 87/302/EEC, part C, p. 89 "Algal inhibition test"
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: NOEC estimated from curve and based on biomass: 1.9% inhibition (LOEC=32.8 mg/kg; 15.8% inhibition. EC50 based ongrowth rate and EbC50 based on biomass.
Source: Dow Benelux N. V. Terneuzen
Test substance: Purity was >99%

(45)

Species: other algae: Selenastrum capricornutum (strain ATCC 22662)
Endpoint: growth rate
Exposure period: 96 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC50: = 345.6
Method: other: EEC algal inhibition test
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Static test condition; T = 22°C; cultured medium, KH_2PO_4=160mg/l and $NaHCO_3$= 100mg/l
Test substance: Diethylene triamine purity >99%

(35)

4.4 Toxicity to Microorganisms e.g. Bacteria

Type: aquatic
Species: activated sludge of a predominantly domestic sewage
Exposure period: 17 hour(s)
Unit: mg/l **Analytical monitoring:** no
EC0: =
EC10: =
EC50: ca. 1.7
LOEC : = .8
--- : =
Method: other: ISO/TC 147/SC 5/WG 1 Guideline
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Measured enpoint was growth rate of Pseudomonas putida.
Test substance: Purity was >99%. Lowest test concentration tested was 0.8 mg DETA/l (LOEC: 27% inhibition of growth observed).

(29)

Type: aquatic
Species: Pseudomonas fluorescens (Bacteria)
Exposure period: 24 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC0: = 500
EC10: =
EC50: =
--- : =
--- : =
Method: other: DEV L8, modified
Year: 1968 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Measured endpoint was bacterial growth.

(46)

Type: aquatic
Species: Pseudomonas putida (Bacteria)
Exposure period: 1 hour(s)
Unit: mg/l **Analytical monitoring:** no
EC0: =
EC10: =
EC50: = 2000
LOEC : = 20
--- : =
Method: other
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Measured endpoint was the respiratory rate.
Test substance: Purity was >99%. EC50 was an extrapolated value and LOEC inhibited 14% of oxidation rates.

(47)

Type: aquatic
Species: Pseudomonas putida (Bacteria)
Exposure period: 17 hour(s)
Unit: mg/l **Analytical monitoring:** no data
EC0: =
EC10: = 16
EC50: = 96
EC90 : = 230
--- : =
Method: other: Bringmann–Kuehn test; according to DIN 38412 Teil 8 (draft)
Year: 1988 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Measured enpoint was growth rate.

(48)

Type: aquatic
Species: other bacteria: nitrifying bacteria
Exposure period: 2 hour(s)
Unit: mg/l **Analytical monitoring:** no
EC0: =
EC10: =
EC50: = 32.7
NOEC : = 6.25
LOEC : = 12.5
Method: other: AKZO
Year: 1989 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Measured endpoint was the respiratory rate.
Test substance: Purity was >99%. LOEC of 12.5 mg DETA/l inhibited respiratory activity 22%.

(49)

4.5 Chronic Toxicity to Aquatic Organisms

4.5.1 Chronic Toxicity to Fish

Species: Gasterosteus aculeatus (Fish, estuary, marine)
Endpoint: other: length and weight of young fish
Exposure period: 28 day
Unit: mg/l **Analytical monitoring:** no
NOEC: = 10
LOEC: =
--- : =
Method: other: draft OECD Guideline "Fish Early Life Stage"
Year: 1989 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: No effects were observed on weight and length. Complete hatching observed in control at day 6 and for 10 mg/l at day9 (62% at day 6). This effect did not occur in a range–finding test conducted at 0.1; 1; 10; 50 or 100 mg/l. The effect is probably due to different housing method in the definite test and not related to the compound.
Source: Dow Benelux N. V. Terneuzen
Test condition: Purity was >99%. Test was semi–static with renewal 2–3 timesa week.

(50)

4.5.2 Chronic Toxicity to Aquatic Invertebrates

Species: Daphnia magna (Crustacea)
Endpoint: other: reproduction rate (number of juveniles per parent animal)
Exposure period: 21 day
Unit: mg/l **Analytical monitoring:** no
NOEC: = 5.6
LOEC: = 11.3
EC50: =
--- : =
Method: other: EEC Draft 4 (XI/681/86)
Year: 1986 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen
Test condition: Purity of DETA was >99%. Test was semi–static with renewal 3times a week.

(51)

TERRESTRIAL ORGANISMS

4.6.1 Toxicity to Soil Dwelling Organisms

Type:
Species:
Endpoint:
Exposure period:
Unit:
Method:
Year: **GLP:**
Test substance:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

4.6.2 Toxicity to Terrestrial Plants

Species:
Endpoint:
Expos. period:
Unit:
Method:
Year: **GLP:**
Test substance:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

4.6.3 Toxicity to other Non–Mamm. Terrestrial Species

Species:
Endpoint:
Expos. period:
Unit:
Method:
Year: **GLP:**
Test substance:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

4.7 Biological Effects Monitoring

Remark: no data available
Source: Dow Benelux N. V. Terneuzen

4.8 Biotransformation and Kinetics

Type:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

4.9 Additional Remarks

Remark: no additional remarks
Source: Dow Benelux N. V. Terneuzen

5.1 Acute Toxicity

5.1.1 Acute Oral Toxicity

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: ca. 1800 mg/kg bw
Method: other: no information
Year: 1944 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Six male rats were tested.
Source: Dow Benelux N. V. Terneuzen

(52)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: = 819 – 1430 mg/kg bw
Method: other: no information
Year: 1958 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Male Long–Evans rats were tested.
Source: Dow Benelux N. V. Terneuzen

(53)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: = 2080 – 2600 mg/kg bw
Method: other: no information
Year: 1949 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Five rats were tested.
Source: Dow Benelux N. V. Terneuzen

(54)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: = 1950 mg/kg bw
Method: other
Year: 1983 **GLP:** no data
Test substance:
Source: Dow Benelux N. V. Terneuzen

(55)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: = 1539 mg/kg bw
Method: other
Year: 1974 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(56)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Value: ca. 1140 mg/kg bw
Method: other
Year: 1957 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(57)

Type: LD50
Species: guinea pig
Sex:
Number of Animals:
Vehicle:
Value: = 600 mg/kg bw
Method: other
Year: 1972 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(58)

5.1.2 Acute Inhalation Toxicity

Type: other: LC90
Species: rat
Sex:
Number of Animals:
Vehicle:
Exposure time: 4 hour(s)
Value: ca. 1.8 mg/l
Method: other
Year: 1972 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Five male and five female rats were observed 14 days and only one concentration was used. 9/10 animals died. This test laboratory is considered to be unthrustworthy. Therefore this study is not considered reliable.
Source: Dow Benelux N. V. Terneuzen

(59)

Type: other
Species: other: cat, rabbit, guinea pig
Sex:
Number of Animals:
Vehicle:
Exposure time: 6 hour(s)
Value:
Method: other: BASF test
Year: 1957 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: No lethality found.
Source: Dow Benelux N. V. Terneuzen
Test substance: Saturated atmosphere (vapour) of DETA at 25°C.

(60)

5.1.3 Acute Dermal Toxicity

Type: LD50
Species: rabbit
Sex:
Number of Animals:
Vehicle:
Value: = 950 – 1240 mg/kg bw
Method: other
Year: 1949 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(54)

Type: LD50
Species: rabbit
Sex:
Number of Animals:
Vehicle:
Value: = 1040 mg/kg bw
Method: other
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(61)

Type: LD50
Species: rabbit
Sex:
Number of Animals:
Vehicle:
Value: ca. 672 mg/kg bw
Method: other
Year: 1974 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(62)

Type: LD50
Species: guinea pig
Sex:
Number of Animals:
Vehicle:
Value: = 170 mg/kg bw
Method: other
Year: 1944 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(52)

5.1.4 Acute Toxicity, other Routes

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Route of admin.: i.p.
Value: = 43 – 127 mg/kg bw
Method: other
Year: 1958 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Male Long–Evans rats were used.
Source: Dow Benelux N. V. Terneuzen

(63)

Type: LD50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Route of admin.: i.p.
Value: = 50 – 103 mg/kg bw
Method: other
Year: 1958 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(63)

Type: LD50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Route of admin.: i.p.
Value: = 455.5 – 558.8 mg/kg bw
Method: other
Year: 1988 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Female mice were used.
Source: Dow Benelux N. V. Terneuzen

(64)

Type: LD50
Species: rat
Sex:
Number of Animals:
Vehicle:
Route of admin.: s.c.
Value: = 855 mg/kg bw
Method: other
Year: 1957 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(65)

Type: LD50
Species: mouse
Sex:
Number of Animals:
Vehicle:
Route of admin.: s.c.
Value: ca. 1690 – 2850 mg/kg bw
Method: other
Year: **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(66)

Type: LD100
Species: rabbit
Sex:
Number of Animals:
Vehicle:
Route of admin.: i.v.
Value: ca. 475 mg/kg bw
Method: other
Year: 1957 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: The hydrochloride was used. A dose of 95 mg/kg was toleratedwithout fatalities.
Source: Dow Benelux N. V. Terneuzen

(66)

5.2 Corrosiveness and Irritation

5.2.1 Skin Irritation

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: highly corrosive
EC classificat.: highly corrosive (causes severe burns)
Method: other
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Exposure time 24 hours; dose 0.01 ml/animal
Source: Dow Benelux N. V. Terneuzen

(55)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: highly corrosive
EC classificat.: highly corrosive (causes severe burns)
Method: Draize Test
Year: 1951 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Exposure time 12 min., shaved abdomen
Source: Dow Benelux N. V. Terneuzen

(67)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: highly corrosive
EC classificat.: highly corrosive (causes severe burns)
Method: Draize Test
Year: 1958 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Exposure time 24h, observation time 72h.
Source: Dow Benelux N. V. Terneuzen

(68)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: corrosive
EC classificat.: corrosive (causes burns)
Method: Draize Test
Year: 1969 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Exposure time 24 hours; dose 0.5 ml/animal
Source: Dow Benelux N. V. Terneuzen

(69)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: highly corrosive
EC classificat.: highly corrosive (causes severe burns)
Method: Draize Test
Year: 1955 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Exposure time, dose, observation period: no data. Belly open. Diluting the amine to 10% in water practically eliminated the reaction.
Source: Dow Benelux N. V. Terneuzen

(70)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: corrosive
EC classificat.: corrosive (causes burns)
Method: Draize Test
Year: 1949 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: Dose: 10 mg/24 h
Source: Dow Benelux N. V. Terneuzen

(71)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: highly corrosive
EC classificat.: highly corrosive (causes severe burns)
Method: Draize Test
Year: 1979 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen

(72)

Species: rabbit
Concentration:

Exposure:
Exposure Time:
Number of Animals:
PDII:
Result: corrosive
EC classificat.:
Method: other: BASF irritation test
Year: 1956 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen

(73)

5.2.2 Eye Irritation

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: highly corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1979 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(74)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: highly corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1951 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: One drop resulted in permanent loss of vision. A drop of a 1% solution in water resulted in slight, transient corneal damage and very slight conjunctivitis. The treated eye was normal 2 days after exposure.
Source: Dow Benelux N. V. Terneuzen

(75)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: highly corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1983 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(76)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1969 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(77)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: highly corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1955 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Undiluted grade 8; 15%, severe corneal injury; 5%, minor injury.
Source: Dow Benelux N. V. Terneuzen

(78)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: highly corrosive
EC classificat.: risk of serious damage to eyes
Method: Draize Test
Year: 1949 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(79)

Species: rabbit
Concentration:
Dose:
Exposure Time:
Comment:
Number of Animals:
Result: irritating
EC classificat.:
Method: other: BASF irritation test
Year: 1956 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(80)

5.3 Sensitization

Type: Guinea pig maximization test
Species: guinea pig
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Positive reactions in 11/20 Hartley albino guinea pigs and cross sensitization with EDA, TETA and other derivatives observed.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA commercial grade

(81)

Type: Guinea pig maximization test
Species: guinea pig
Number of Animals:
Vehicle:
Result: not sensitizing
Classification: not sensitizing
Method: other
Year: **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Positive reactions in 16/20 Hartley albino guinea pigs and cross sensitization with EDA, TEAT, AEP, AEEA, TEPA and piperazine found.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA–HP grad

(82)

Type: Guinea pig maximization test
Species: guinea pig
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other: see reference
Year: 1978 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(83)

Type: Patch–Test
Species: human
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other: see reference
Year: 1963 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(84)

Type: Patch–Test
Species: human
Number of Animals:
Vehicle:
Result: not sensitizing
Classification: not sensitizing
Method: other: see reference
Year: 1989 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(85)

Type: Patch–Test
Species: guinea pig
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other: see reference
Year: 1962 **GLP:** yes
Test substance: other TS
Source: Dow Benelux N. V. Terneuzen

(86)

Type: no data
Species: human
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other: see reference
Year: 1957 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Source: Dow Benelux N. V. Terneuzen

(87)

Type: no data
Species: guinea pig
Number of Animals:
Vehicle:
Result: sensitizing
Classification: sensitizing
Method: other: see reference
Year: 1957 **GLP:** yes
Test substance: other TS
Source: Dow Benelux N. V. Terneuzen

(87)

5.4 Repeated Dose Toxicity

Species: rat **Sex:** male/female
Strain: other
Route of admin.: inhalation
Exposure period: 14 days
Frequency of treatment: daily
Post. obs. period: no
Doses: 5000, 10000, 25000 or 50000 mg/kg/day
Control Group: yes
NOAEL: >= 5000 mg/l
LOAEL: = 10000 mg/kg bw
Method: other
Year: 1986 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Ten animals/sex/group were used.
Result: Weight loss at 50000 mg/kg/d and reduced body weight gain at10000 mg/kg/d and above. At 25000 mg/kg/d and above reduced food consumption and weight of spleen (absolute and relative) was noted.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA-hydrochloride

(88)

Species: rat **Sex:** no data
Strain: other: Harlan-Wistar albino
Route of admin.: gavage
Exposure period: 7 days
Frequency of treatment: daily
Post. obs. period: no data
Doses: 240, 610, 1465 mg/kg bw/d
Control Group: other: 2 control groups
NOAEL: < 240 mg/kg bw
LOAEL: = 610 mg/kg bw
Method: other: see reference
Year: 1974 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: Groups of 5 male and 5 female rats were used. No treatment-related histopathological findings. Body weight depression found at 610 and 1465 mg/kg bw/d and increased iver weight in males at 1465 mg/kg bw/day.
Source: Dow Benelux N. V. Terneuzen

(89)

Species: rat **Sex:** no data
Strain: other: Alderley-Park
Route of admin.: gavage
Exposure period: 3 weeks
Frequency of treatment: 6 hours/day for 5 days/week
Post. obs. period: no
Doses: 0.55 mg/l/6 hours
Control Group: no
NOAEL: < .55 mg/kg bw
LOAEL: =
Method: other: see reference
Year: 1970 **GLP:** no
Test substance: as prescribed by 1.1 - 1.4
Remark: No signs of toxicity were observed. At autopsy all organs were found normal.
Source: Dow Benelux N. V. Terneuzen

(90)

Species: rat **Sex:** male/female
Strain: Wistar
Route of admin.: gavage
Exposure period: 7 days
Frequency of treatment: once per day
Post. obs. period: no
Doses: 100, 300, 500, 1000 mg/kg/day
Control Group: yes
Method: other: OECD draft guide–line 421 for testing of chemicals
Year: 1992 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: Four animals per group; DETA purity = 99.4%; Dose–finding study for a reproduction/developmental study, according to OECD guideline 421.
Result: Animals in the 1000 mg/kg group showed a severe reaction to the treatment, as indicated by the mortality rate and macroscopic observations. Animals in the 500 mg/kg group showed a moderate reaction as concluded from pathological examination and decreased body weight. Animals in the 300 mg/kg group showed a slight decrease in food consumption.
Source: Dow Benelux N. V. Terneuzen

(91)

Species: rat **Sex:** male/female
Strain: other
Route of admin.: oral unspecified
Exposure period: 90 days
Frequency of treatment: daily
Post. obs. period: 4 weeks (control and high dose group only)
Doses: 1000, 7500 or 15000 mg/kg in the diet (equal to: 70, 530, 1060 mg/kg bw/day and 80, 620, 1210 mg/kg bw day for males and females, rsp.)
Control Group: other
NOAEL: 70 – 80 mg/kg bw
LOAEL: 530 – 620 mg/kg bw
Method: other
Year: 1981 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Result: Several treatment–related effects on in–life, clinical pathology and organ weight measurements were observed for the mid– and high dose groups through the 13–week treatment period. Decreases in food consumption in males and females at the high dose. Dose–related decreases in body weight or weight gain in mid– and high–dose groups. Increased MCV and MCH in males in the mid and high–dose groups. In females, decreased glucose and albumin, and increased MCV in the highdose group, and similar changes in glucose and MCV in the mid dose group. Dose–related increases in WBC and lymphocytes were found in mid– and high–dosed females. Increased urine pH in females from mid– and high dose groups, possibly associated with increase in kidney weight and/or excretion of test material was observed after 13–weeks of exposure. In females, increased kidney and

liverweight (mid– and high dose), and adrenal (high dose only). During recovery, female rat food consumption was great than the concurrent control group and body weights returned to control levels. Male body weights remained lower than the controls throughout the recovery period.
Source: Dow Benelux N. V. Terneuzen
Test substance: Dihyrochloride salt of DETA.

(92)

Species: rabbit **Sex:** male/female
Strain: Fischer 344
Route of admin.: oral feed
Exposure period: up to 11 days
Frequency of treatment: daily
Post. obs. period: no data
Doses: 190, 475 mg/kg bw/day
Control Group: yes, concurrent no treatment
NOAEL: < 190 mg/kg bw
LOAEL: = 190 mg/kg bw
Method: other: see reference
Year: 1957 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: Application as hydrochloride showed similar results.
Result: The application of the compound as base was lethal for all animals of the high dose group after 6–8 days, and for all animals of the lower dose group after 4–11 days. Slight reduction in weight and diarrhea could be observed. There was also a slight decrease in hemoglobin and erythrocytes. The function of the liver was unaffected. At necropsy, animals showed an inflammation of the stomach mucosa and lung–edema. Two animals/dose were used in this study.
Source: Dow Benelux N. V. Terneuzen

(93)

Species: rabbit **Sex:** no data
Strain: no data
Route of admin.: drinking water
Exposure period: 6 months
Frequency of treatment: daily
Post. obs. period: no
Doses: 1 and 10 mg/kg
Control Group: yes
NOAEL: = 1 mg/kg
LOAEL: = 10 mg/kg
Method: other
Year: 1972 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Result: In the high dose group prothrombine activity decreased to 62% of control values and ASAT and ALAT activities increasedup to 3 times compared to control values.
Source: Dow Benelux N. V. Terneuzen

(94)

Species: rabbit **Sex:** no data
Strain: no data
Route of admin.: drinking water
Exposure period: 28 days
Frequency of treatment: daily
Post. obs. period: no
Doses: 2 and 40% (w/v)
Control Group: yes
NOAEL: >=
LOAEL: = 2 %
Method: other
Year: 1982 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Since no specific methodological data are available is it not possible to obtain a clear impression of the actual dermal exposure.
Ten animals/sex/group were used.
Source: Dow Benelux N. V. Terneuzen

(95) (96)

Species: cat **Sex:** male/female
Strain: Fischer 344
Route of admin.: oral feed
Exposure period: up to 50 days
Frequency of treatment: daily
Post. obs. period: no data
Doses: 95, 190 mg/kg bw/day
Control Group: yes
NOAEL: = 95 mg/kg bw
LOAEL: = 95 mg/kg bw
Method: other: see reference
Year: 1957 **GLP:** yes
Test substance: other TS
Remark: Application as hydrochloride resulted in the death of 1 cat at 190 mg/kg be/d after 14 days. Histopathology revealed nephrosis in the cat that died and changes in stomach nucosa.
Result: The application of the compound as base was lethal for all animals of the high dose group after a 3 day or 10 day application. Blood vomiting, diarrhea and weight reduction were observed. Dead animals showed a strong increase in blood urea. In the urine, erythrocytes and cylinders were seen. The animals had a slight anemia, but the liver function was unaffected. At necropsy, severe damage of the stomach mucosa was detected. After application of the lower dose, only one animal died after 5 doses, while the same dose was tolerated by the other cat for 50 times. Two animals/dose were used in this study.
Source: Dow Benelux N. V. Terneuzen

(97)

Species: guinea pig **Sex:** male/female
Strain: New Zealand white
Route of admin.: dermal
Exposure period: 6 months
Frequency of treatment: daily
Post. obs. period: no
Doses: 0.6 mg/kg
Control Group: yes
NOAEL: = .6 mg/kg bw
LOAEL: =
Method: other
Year: 1972 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: No deviations from the controls were observed.
Result: "Exposure, environmental fate, and health and ecological effects of DETA", Argonne National Lab., submitted to U.S. EPA, 26–2–1982
Source: Dow Benelux N. V. Terneuzen

5.5 Genetic Toxicity 'in Vitro'

Type: Ames test
System of testing: S. typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: 0.01; 0.1; 1.0; 5.0 and 10 µl/plate
Metabolic activation: with and without
Result: negative
Method: other
Year: 1978 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA (Substance B–134) run in duplicate.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA 1258–139A

(98)

Type: Ames test
System of testing: Salmonellla typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: –S9: 100, 200, 300, 400, 500 µg/plate; +S9: 400, 500, 800, 1200, 1600, 2000 µg/plate
Metabolic activation: without
Result: negative
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA 1258–139A was run in duplicate.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA 1258–139A

(99)

Type: Ames test
System of testing: Salmonellla typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: –S9: 100, 200, 300, 400, 500 µg/plate; +S9: 200, 400, 500, 600, 800, 1000 µg/plate
Metabolic activation: with and without
Result: ambiguous
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA 1258–139B was run in duplicate.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA 1258–139B

(99)

Type: Ames test
System of testing: Salmonellla typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: –S9: 3–300 µg/plate; +S9: 100–10000 µg/plate
Metabolic activation: with and without
Result: negative
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA (Sample A) was run in duplicate.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA Sample A

(100)

Type: Ames test
System of testing: Salmonellla typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: –S9: 10–1000 µg/plate; +S9: 100–5000 µg/plate
Metabolic activation: no data
Result: positive
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA (Sample A) was run in duplicate. 1.6 to 2–fold Increase in mutans in TA98, TA100, and TA1537 withoutS9. Retesting with concentrations of 200–500 µg/plate was positive in TA1537 without S9.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA Sample B

(100)

Type: Ames test
System of testing: Salmonella typhimurium TA 98, TA 100, TA1535, TA 1537, TA1538
Concentration: range 0.001 – 10 µl/plate
Metabolic activation: with and without
Result: positive
Method: other
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: No cytotoxicity. Positive only in strains TA 1537 and TA 1538 without metabolic activation. No dose–related response was obtained.
Source: Dow Benelux N. V. Terneuzen

(101)

Type: Ames test
System of testing: S. typhimurium TA 98, TA 100, TA1535, TA 1537
Concentration: no data
Metabolic activation: with and without
Result: negative
Method: other
Year: **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(102) (103)

Type: Ames test
System of testing: Salmomella typhimurium TA100 and TA1535
Concentration: no data
Metabolic activation: with and without
Result: negative
Method: other
Year: **GLP:** no data
Test substance: other TS
Remark: According to the authors could the positive results in this study be ascribed to alkylating impurities.
Source: Dow Benelux N. V. Terneuzen

(104)

Type: Ames test
System of testing: Salmonella typhimurium TA100
Concentration: no data
Metabolic activation: no data
Result: negative
Method: other
Year: **GLP:** yes
Test substance: other TS
Remark: The compound showed only slight activity in this strain.
Source: Dow Benelux N. V. Terneuzen

(105)

Type: Ames test
System of testing: Salmonella typhimurium TA98, TA100, TA1535, TA 1537, TA 1538
Concentration: 1000, 1500, 2000, 2500 and 3000 µg/plate
Metabolic activation: with and without
Result: ambiguous
Method: other: EPA
Year: **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: DETA was weakly mutagenic in TA98 without activation (3.7 fold dose–related increase in the mutation rate). All other assays were negative. Test run in duplicate.
Source: Dow Benelux N. V. Terneuzen

(106)

Type: Ames test
System of testing: Salmonellla typhimurium TA98
Concentration: 600, 1200, 1800, 2400 and 3000 µg/plate
Metabolic activation: with and without
Result: negative
Method: other: EPA
Year: **GLP:** no data
Test substance: other TS
Remark: Purified DETA did not induce a positive response in either of the two trials performed.
Source: Dow Benelux N. V. Terneuzen

(107)

Type: Gene mutation in Saccharomyces cerevisiae
System of testing: S. typhimurium TA98, TA100, TA1535, TA1537, TA1538
Concentration: 0.001; 0.01; 0.1; 1.0; 5.0 µl/plate
Metabolic activation: with and without
Result: negative
Method: other
Year: 1978 **GLP:** no
Test substance: as prescribed by 1.1 – 1.4
Remark: Test with DETA (Substance T1884) run in duplicate.
Source: Dow Benelux N. V. Terneuzen

(108)

Type: Gene mutation in Saccharomyces cerevisiae
System of testing: Saccharomyces cerevisiae D4
Concentration: 0.01; 0.1; 1.0; 5.0 and 10 µl/plate
Metabolic activation: no data
Result: negative
Method: other
Year: 1978 **GLP:** no data
Test substance: other TS
Remark: Test (Substance B314) run in duplicate. Toxic at 10 µl/plate.
Source: Dow Benelux N. V. Terneuzen

(109)

Type: Gene mutation in Saccharomyces cerevisiae
System of testing: Saccharomyces cerevisiae D4
Concentration: 0.001; 0.01; 0.1; 1.0; 5.0 µl/plate
Metabolic activation: with and without
Result: ambiguous
Method: other
Year: 1978 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Test (Substance B314) run in duplicate.
Source: Dow Benelux N. V. Terneuzen

(108)

Type: Mammalian cell gene mutation assay
System of testing: CHO cells (HGPRT assay)
Concentration: 0.0125; 0.025; 0.05; 0.1; 0.2; 0.4% (v/v)
Metabolic activation: with and without
Result: negative
Method: other: EPA
Year: **GLP:** no data
Test substance: other TS: DETA–HP, DETA–comm. and DETA–HC
Remark: Test was negative for DETA–HP and DETA–HC. 0.4% was cytotoxic. DETA–comm. showed positive results at 0.2% (v/v) in a second test with concentrations 0.0125–0.2% (v/v) with S9. No dose–related response was obtained.
Source: Dow Benelux N. V. Terneuzen
Test substance: Solvent for test substances was DMSO.

(110)

Type: Sister chromatid exchange assay
System of testing: CHO cells
Concentration: -S9: 100-400 µg/plate; +S9: 400-700 µg/plate
Metabolic activation: with and without
Result: negative
Method: other: EPA
Year: **GLP:** no data
Test substance: other TS: DETA Sample A
Remark: Test with DETA Sample A run in duplicate. Positive without S9, marginally positive effects without S9.
Source: Dow Benelux N. V. Terneuzen

(111)

Type: Sister chromatid exchange assay
System of testing: CHO cells
Concentration: 0.0125; 0.025; 0.05; 0.1; 0.2 % (v/v)
Metabolic activation: with and without
Result: negative
Method: other: EPA
Year: **GLP:** no data
Test substance: other TS: DETA-HP, DETA-comm. and DETA-HC
Remark: 0.2% was cytotoxic. Test was positive for DETA-HP and DETA-comm. without S9 at 0.2% and for DETA-HC without S9 at 0.1%. No dose-related response was obtained
Since no dose-related response was obtained the overall results were considered to be negative.
Source: Dow Benelux N. V. Terneuzen

(110)

Type: Unscheduled DNA synthesis
System of testing: Rat hepatocytes
Concentration: 0.0001; 0.001; 0.003; 0.01; 0.03; 0.1 % (v/v)
Metabolic activation: with and without
Result: ambiguous
Method: other: EPA
Year: 1980 **GLP:** yes
Test substance: other TS: DETA-HP, DETA-comm. and DETA-HC
Remark: No cytotoxicity observed at the highest dose.
Source: Dow Benelux N. V. Terneuzen

(110)

Type: other: Cytogenetic assay, chromosome aberration
System of testing: CHO cells (CHO–K1, CCL61)
Concentration: 250, 833 and 2500 micrograms/ml
Metabolic activation: without
Result: negative
Method: other: EPA protocol
Year: 1987 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Source: Dow Benelux N. V. Terneuzen

(112)

5.6 Genetic Toxicity 'in Vivo'

Type: Drosophila SLRL test
Species: Drosophila melanogaster **Sex:** male
Strain: other: Canton–S
Route of admin.: oral feed
Exposure period: 22–24 h
Doses: 60 mM = 6360 mg
Result:
Method: other
Year: 1983 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Result: negative
Source: Dow Benelux N. V. Terneuzen

(113)

Type: Micronucleus assay
Species: mouse **Sex:** male/female
Strain: CD–1
Route of admin.: gavage
Exposure period: 24, 48 and 72 hours
Doses: 85, 283, 850 mg/kg bw
Result:
Method: OECD Guide–line 474 "Genetic Toxicology: Micronucleus Test"
Year: 1989 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Result: The test substance did not significantly increase the frequency of micronucleated polychromatic erythrocytes and was, therefore, considered negative in the mouse bone marrowmicronucleus test.
Source: Dow Benelux N. V. Terneuzen

(114)

5.7 Carcinogenicity

Species: rat **Sex:** male/female
Strain: Wistar
Route of admin.: dermal
Exposure period: life–time
Frequency of treatment: daily
Post. obs. period: no data
Doses: 0.4 ml/animal (1:10 diluted solution)
Result:
Control Group: yes
Method: other
Year: 1970 **GLP:** no data
Test substance: as prescribed by 1.1 – 1.4
Remark: Five male and 5 female rats/dose were used.
Result: The average days of survival were 407 days in treated rats and 581 days in control rats. There were no notable hematologic or pathologic findings in treated rats. There was no effect on body weights. Histopathological changes were observed mainly in kidney and liver. Some slight histopathological changes were observed in both spleen and adrenals, but there was no difference between control and treated animals. No effects in offsprings were found.
Source: Dow Benelux N. V. Terneuzen

(115)

Species: mouse **Sex:** male
Strain: other: C3H/HeJ
Route of admin.: dermal
Exposure period: life–time
Frequency of treatment: 3 days/week
Post. obs. period: no data
Doses: 1.25 mg/animal (ca. 62.5 mg/kg bw) 5% (v/v)
Result:
Control Group: yes, concurrent vehicle
Method: other: see reference
Year: 1982 **GLP:** yes
Test substance: as prescribed by 1.1 – 1.4
Remark: 50 animals/group were used. Control were treated with deionized water.
Result: No treatment–related skin tumors were observed, nor was there evidence of increased incidence of any internal tumor.The survival time nor the mortality rate significantly differed from the controls.
Source: Dow Benelux N. V. Terneuzen
Test substance: DETA–comm. and DETA HP were used.

(116)

Species: rat **Sex:** male/female
Strain: Wistar
Route of admin.: s.c.
Exposure period: life-time
Frequency of treatment: daily (10 mg/kg bw); every other day (50 mg/kg bw)
Post. obs. period: no data
Doses: 10, 50 mg/kg bw
Result:
Control Group: yes
Method: other
Year: 1970 **GLP:** no data
Test substance: as prescribed by 1.1 - 1.4
Remark: Five male and 5 female rats/dose were used.
Result: The average days of survival were 335 days in the low dose group, and 275 days in the high dose group, and 581 days forthe rats in the control group. There were no notable hematological or pathological findings in the rats of each group. There was no change in b.w. between treated rats and controls. Histopathological changes were observed mainly in the kidney and the liver. The damages were very marked in the animals of the high dose group. Renal tubular damage wasdemonstrated in the rats of the low dose group. Some slight histopathological changes were observed in spleen and adrenals. Animals were mated and litter size was observed. No effect on offspring was found.
Source: Dow Benelux N. V. Terneuzen

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5.8 Toxicity to Reproduction

Type: One generation study
Species: rat **Sex:** male/female
Strain: Wistar
Route of admin.: gavage
Exposure Period: 29-54 days
Frequency of treatment: once per day
Premating Exposure Period
male: 2 weeks
female: 2 weeks
Duration of test: 29-54 days
Doses: 30, 100, 300 mg/kg/day
Control Group: yes
NOAEL Parental: = 100 mg/kg bw
NOAEL F1 Offspr.: = 30 mg/kg bw
NOAEL F2 Offspr.: =
Method: other: OECD "Oral preliminary and reproduction/developmental toxicity screening study" (no. 421 draft)
Year: 1992 **GLP:** yes
Test substance: as prescribed by 1.1 - 1.4
Remark: DETA was administered daily by gavage to male and female Wistar rats at levels of 30, 100, and 300 mg/kg b.w. during a 2-week premating period, and during mating and gestation up to day 4 post partum or at least during a 4-week period,

to screen its effect on male and female reproductive performance and on the development of the offspring.

Result: During the reproduction study no mortality occurred that could be ascribed to the administration of DETA. Data obtained through clinical observations, and macroscopic and microscopic examinations, revealed no effects of the treatment. Food consumption data showed a statistically significant decrease in the females of the 300 mg/kg b.w. during the first week of the study. High dose male body weight was decreased from day 0–28 and high dose female bodyweight gain was decreased during premating and during the gestation period (days 0–21). The no–adverse effect level for parental toxicity is 100 mg/kg bw per day.

Most mating and litter data like precoital time, mating index, fertility index, number of live and dead pups, showedno adverse effects of the treatment. Maternal performance ofthe females in the 100 mg/kg and 300 mg/kg b.w. DETA groups were affected: duration of gestation was increased statistically significantly, and post–implantation loss was increased in a dose–related way. Due to the relatively post–implantation loss the mean litter size was reduced in the mid and high dose group. The no–adverse effect level forreproduction and development is 30 mg/kg bw per day.

Pup body weights and clinical and necropsy observations did not reveal any reaction to the treatment.

Source: Dow Benelux N. V. Terneuzen

Test substance: DETA purity = 99.4%

(91)

5.9 Developmental Toxicity/Teratogenicity

Species: **Sex:**
Strain:
Route of admin.:
Exposure period:
Frequency of treatment:
Duration of test:
Doses:
Control Group:
Method:
Year: **GLP:**
Test substance:
Remark: no data available
Source: Dow Benelux N. V. Terneuzen

5.10 Other Relevant Information

Type: Metabolism
Remark: The route of administration, oral or endotracheal, had little effect on the distribution within the body or the elimination of radioactivity from the rat. Feces and urine were the primary routes of excretion with less than 2% of the administered dose being expired as 14CO2. More than 96% of the recovered dose was eliminated within 48 h after dosing. In comparing results from animals receiving the compound at 500 mg/kg with those receiving it at 50 mg/kg there was a significant increase in the percentage of radioactivity excreted in the urine and a significant decrease in that eliminated as 14CO2 at the higher dose level. The route of administration did not affect the following pharmacokinetic parameters at the 50 mg/kg level: bioavailability, total clearance or terminal half–life.
Source: Dow Benelux N. V. Terneuzen

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5.11 Experience with Human Exposure

Remark: – Effects in humans:
DETA is a potent allergen that causes eczema, dermatitis andallergenic effects upon the respiratory tract (asthma–like) of susceptible individuals.

– Exposure data (humans, see table below):
Exposure data for diethylene triamine (DETA), have been collected at the Dow Benelux Terneuzen location. The data were obtained from the Dow Amines Plant (production facility, the Chemical Handling Department where drumming takes place and the Chemical Lab where Quality Assurance measurements are being carried out. All data relate to exposure by inhalation. Distribution of exposure results arereported as percentage of the results below a certain fraction of the TLV–TWA. These data were normally obtained for an 8 hour working period in the period January 1986 – November 1992.
DETA exposure data from the Dow Amines Plant, Terneuzen

JOB CLASS	ACGIH TLV–TWA (ppm)	NO.	MEAN (ppm)	RANGE % TLV 0–10	10–25	25–100	50–100
Panel Operator	1	2	0.10	2			
Outside Operator	1	16	0.10	16			
Reaction Operator	1	8	0.10	8			
Destillation							

Operator	1	11	0.093	11		
Shift Supervisor	1	2	0.10	2		
Chem. Lab worker	1	10	0.10	10		
Loading Operator	1	1	0.10	1		
Amines and mobile drumming	1	17	0.16	14	2	1
Outside Operator	1	1	0.04	1		

Source: Dow Benelux N. V. Terneuzen

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7.1 Risk Assessment

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